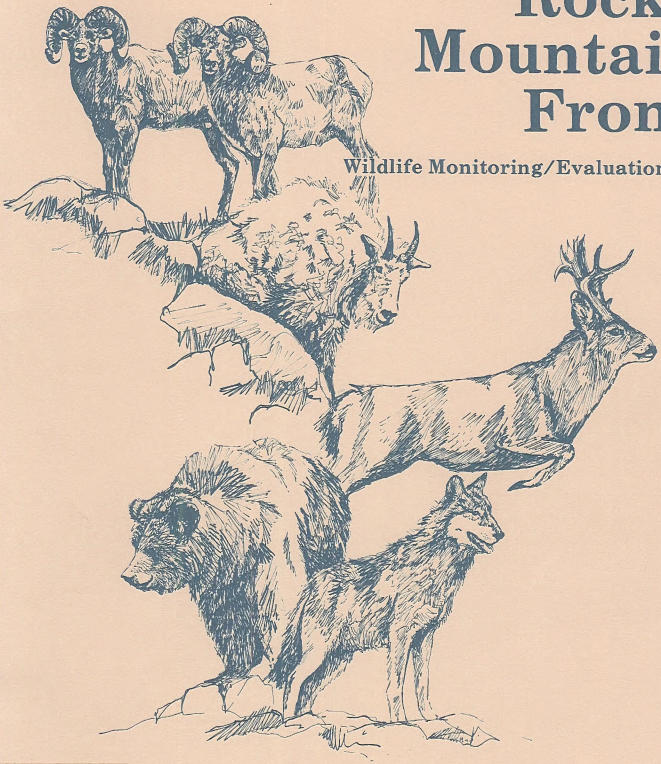
Interagency

Rocky Mountain Front

Wildlife Monitoring/Evaluation Program



SEPTEMBER 1987

Management Guidelines for Selected Species
Rocky Mountain Front Studies

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

Interagency Rocky Mountain Front
Wildlife Monitoring/Evaluation Program

Management Guidelines

Grizzly Bear	Elk
Mountain Goat	Mule Deer
Bighorn Sheep	Raptors

Approved By:

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SEP 1 1987
Date

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Date

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SEP 1 1987
Date

Interagency

ROCKY MOUNTAIN FRONT

Wildlife Monitoring/Evaluation Program

Management Guidelines for Selected Species, Rocky Mountain Front Studies.

ACKNOWLEDGMENTS

The contents of this document have been developed over the past several years (1980-87) during which time some individuals have been involved continuously and others for shorter periods due to study completion, changes in job assignments or transfers within their agencies. The following list includes all of the people who have participated on the Technical Committee and/or been directly involved in monitoring studies on the species indicated since the Rocky Mountain Front Monitoring Program was initiated.

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Special appreciation is extended to Ann Bishop, BLM, Lewistown, for the cover and all illustrations within this document.

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INTRODUCTION

The Interagency Rocky Mountain Front Monitoring and Evaluation Program was initiated in 1980 in response to the collective needs of the participating agencies. These needs involved both the proactive management of the diverse wildlife resource as well as planning and evaluation of a multitude of human use activities and management of other natural resources. The guidelines developed from this coordinated interagency effort are best management practices to maintain or enhance selected wildlife species and their habitats. Application and monitoring of the guidelines will assist land and wildlife managers in meeting their wildlife and habitat objectives, will assist managers in coordinating multiple-use objectives with the biological requirements of these wildlife resources and will provide an analytical tool in evaluating effects of proposed activities.

It is recognized that all potential activities cannot be conducted simultaneously while maximizing outputs from all resource uses. Multiple-use involves both complimentary and competing activities at various times and locations and by definition may involve maximizing benefits from one resource use while precluding all or parts of the benefits of a competing use. The guidelines were not developed with the intent of precluding certain activities, but rather to assist in providing a balance of land uses while at the same time preserving the integrity and diversity of these wildlife resources. It is recognized that application of these guidelines in designing activities may require certain activities to be modified, restricted, or even precluded in order to conserve the diverse wildlife resources of the Rocky Mountain Front. On the other hand, they identify windows of opportunity where little or no competition exists, they identify opportunities for enhancement of these wildlife resources, and finally, they identify those instances where there is competitive overlap so more informed management decisions can be made, resulting in balanced stewardship of the broad array of national resources.

In the event that future efforts or information result in the need for a new guideline or the modification of an existing guideline, it can be submitted at anytime to an appropriately designated interagency committee for review and approval.

The following management guidelines are based on the best information currently available. They are a result of current or recently completed studies on selected wildlife species. Field investigators conducting the studies have completed extensive literature reviews on the various species considered. The guidelines which have been formulated and presented in this document are not only the result of the study findings and literature review, but incorporate the professional judgement of the technical personnel involved.

OBJECTIVES

The need for management is predicated on management concerns involving the effects of existing and proposed land uses and human activities upon various wildlife species and their habitat. The objective of the development and application of management guidelines is to avoid or minimize the following effects of human related activities which may adversely impact some or all of the selected wildlife species being considered:

A. Physical destruction of important wildlife habitat components.
B. Human disturbance that would displace various wildlife species from important seasonal use areas.
C. Increased direct human caused mortality.
D. Increased stress due to higher human activity levels.
E. Direct mortality or physical impairment resulting from environmental (chemical) contaminates.
F. Increased wildlife/human interaction resulting from habitat intrusion or displacement.

MANAGEMENT GUIDELINES

Management guidelines provide coordination measures designed to avoid or minimize the potential conflicts previously identified between human related activities and wildlife. Although many of the guidelines are applicable to a variety of human activities, some of them are specific to a single activity. Oil and gas exploration and development has received special emphasis due to the relatively high level of activity in recent years. As a result, some of the guidelines apply specifically to that activity.

The guidelines have not been submitted for interdisciplinary analysis, public comment, or NEPA review. Where they have been employed, they were exposed to this review as part of the public planning process. Decision makers for each agency involved will determine what is a reasonable and prudent application of these guidelines in each case. The resulting planning, evaluation, and decision process will conform to the NEPA process. Departure from the guidelines, the impacts resulting from that departure, and the justification for such departure will be displayed in the appropriate planning documents.

Approved management guidelines will be included in permits, contracts or other formal authorizations of human activities as applicable. Omissions or modifications of guidelines as they are applied to specific activities will be documented in compliance with NEPA.

MONITORING

A majority of the radio tracking and habitat survey data collected to date has been baseline information including the identification of seasonal ranges, reproduction areas, breeding areas and migration corridors. Future studies will place increasing emphasis on the monitoring of effects of increased human activity levels, particularly those associated with oil and gas exploration, on the wildlife species being studied. The management guidelines presented in this document are only partially based on monitoring information collected during the current studies on the Rocky Mountain Front. An important consideration in further monitoring efforts will be to test and validate the guidelines as to their effectiveness and applicability. Projects that may be proposed in the future should include as part of the cost of the project, funding to help assist in validating these guidelines.

PART A — GENERAL MANAGEMENT GUIDELINES

The following general management guidelines are applicable coordination measures that will be considered when evaluating the effects of existing and proposed human activities in identified seasonally important habitats for a variety of wildlife species:

1. Identify and evaluate for each project proposal the cumulative effects of all activities, both existing uses and other planned projects. Potential site specific effects of the project being analyzed are a part of the cumulative effects evaluation which will apply to all lands within a designated biological unit. A biological unit is an area of land which is ecologically similar and includes all of the yearlong habitat requirements for a sub-population of one or more selected wildlife species.

2. Evaluate human activities, combinations of activities, or the zones of influence of such activities that occur on seasonally important wildlife habitats and avoid those which may adversely impact the species or reduce habitat effectiveness.

3. Space concurrently active seismographic lines or line segments at least nine (9) air miles apart to allow an undisturbed corridor into which wildlife can move when displaced (Olson, G., 1981).

4. Establish helicopter flight patterns of not more than one-half (1/2) mile in width along all seismographic lines, between landing zones and the lines, and between landing zones and other operations, unless flying conditions dictate deviations due to safety factors.

5. Because helicopters produce a more pronounced behavioral reaction by big game and raptors than do fixed-wing aircraft, helicopters will maintain a minimum altitude of 600 feet (183 meters) above ground level when flying between landing zones and work areas where landing zones are not located on seismic lines, unless species specific guidelines recommend otherwise (Hinman, H., 1974; McCourt, K.H., et al. 1974; Klein, D.R., 1973; Miller, F.L. and A. Gunn, 1979).

6. Designate landing zones for helicopters in areas where helicopter traffic and associated human disturbances will have the minimum impact on wildlife populations. Adequate visual and/or topographic barriers should be located between landing zones and occupied seasonal use areas.

7. The use of helicopters instead of new road construction to accomplish energy exploration and development is encouraged.

8. Base road construction proposals on a completed transportation plan which considers important wildlife habitat components and seasonal use areas in relation to road location, construction period, road standards, seasons of heavy vehicle use, road management requirements, etc.

9. Use minimum road and site construction specifications based on projected transportation needs. Schedule construction times to avoid seasonal use periods for wildlife as designated in the species specific guidelines.

10. Locate roads, drill sites, landing zones, etc. to avoid important wildlife habitat components based on a site specific evaluation.

11. Insert "dog-legs" or visual barriers on pipelines and roads built through dense vegetative cover areas to prevent straight corridors exceeding one-fourth (1/4) mile where vegetation has been removed (Stubbs, C.W. and G.J. Markham, 1979).

12. Roads which are not compatible with area management objectives and are no longer needed for the purpose for which they were built will be closed and reclaimed. Native plant species will be used whenever possible to provide proper watershed protection on disturbed areas. Wildlife forage and/or cover species will be utilized in rehabilitation projects where deemed appropriate.

13. Keep roads which are in use during oil and gas exploration and development activity closed to unauthorized use. Place locked gates and/or road guards at strategic locations to deter unauthorized use when activities are occurring on key seasonal ranges.

14. Impose seasonal closures and/or vehicle restrictions based on wildlife or other resource needs on roads which remain open.

15. Bus crews to and from drill sites to reduce activity levels on roads. Shift changes should be scheduled to avoid morning and evening wildlife feeding periods.

16. Keep noise levels at a minimum by muffling such things as engines, generators and energy production facilities.

17. Prohibit dogs during work periods.

18. Prohibit firearms during work periods or in vehicles traveling to and from work locations.

19. Seismographic and exploration companies should keep a daily log of activities. Items such as shift changes, shut down/start up times, major changes in noises or activity levels, and the location on the line where seismic crews are working should be recorded.

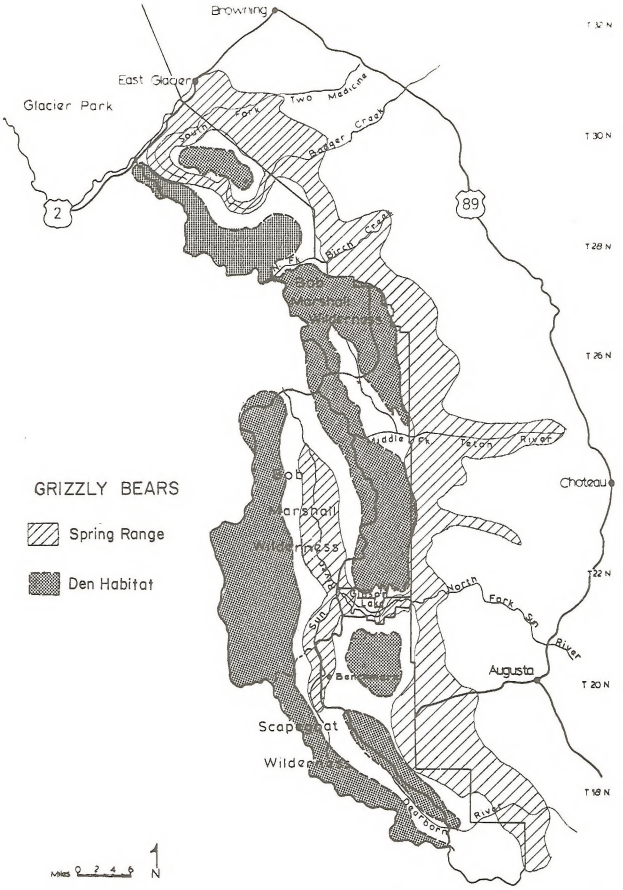
PART B — SPECIES SPECIFIC MANAGEMENT GUIDELINES

The species specific management guidelines which follow provide coordination measures necessary to protect important habitats or seasonal use areas for several wildlife species which were selected for intensive baseline surveys on the Rocky Mountain Front Study Area. Monitoring of the effects of human activities on these species and their habitats will continue to receive special study emphasis.

Maps which delineate the seasonally important habitats for which timing restrictions are specified have not been included in the management guideline document and are not available for general distribution. Copies of these maps are available for inspection at the offices of the four Agencies involved in the Rocky Mountain Front Wildlife Monitoring Program.

These guidelines together with the "general management guidelines" will minimize, but not eliminate, the impacts of disturbances caused by human activities on these species. Species specific guidelines are currently available for grizzly bear, mountain goat, bighorn sheep, elk, mule deer and raptors.

GRIZZLY BEAR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GRIZZLY BEAR

The Interagency Grizzly Bear Committee approved the application of guidelines on National Forest System, Bureau of Land Management (BLM) and National Park System lands throughout grizzly bear ecosystems in the States of Idaho, Montana, Washington, and Wyoming. (November 26, 1986 Federal Register, Vol. 51, No. 228). These guidelines are known as the Interagency Grizzly Bear Guidelines (IGBG). The IGBG provide definition and management direction for grizzly bear Management Situations I, II, III, IV and V and further provide generalized guidelines on "how to coordinate various activities with the bear in the various management situations. Grizzly bear habitat along the Rocky Mountain Front has been stratified into grizzly bear management situations pursuant to the IGBG.

The Rocky Mountain Front Guidelines (RMFG) found in this document do not identify management situations or provide definitions or management directions of the stratification. The Management Situations designated on the Front pursuant to the IGBG identify where the emphasis on grizzly bear needs to be placed, and if there is a conflict, where the conflict should be resolved in favor of the bear. The RMFG represent best management practices for coordinating multiple use activities within the grizzly bear management situations delineated on the Front. The RMFG are detailed coordination measures for specific activities that will assist land managers in meeting the management direction provided in the IGBG. They are consistent with the IGBG and further refine the IGBG to specific habitat conditions on the Front.

Study results documented to date along the east Rocky Mountain Front are the basis for the development of management guidelines for grizzly bear and their habitat. During the period from 1977-1979, research was carried out by the Border Grizzly Project under a contract with the BLM.

Since 1980 the Montana Department of Fish, Wildlife and Parks has assumed the intensive grizzly bear monitoring work with funding continuing from the Interagency Rocky Mountain Front Task Force, private industry (ARCO, Mobil Oil Corporation, Shell Oil, American Petrofina, Williams Exploration, Sun Exploration) and the Nature Conservancy. In addition, a BLM funded livestock/ grizzly bear interaction study was conducted by a graduate student from Montana State University during the field seasons of 1985 and 1986.

These guidelines were developed as a direct result of grizzly bear monitoring conducted on the East Front. They represent guidelines that, when followed, will mitigate but not totally eliminate influences of human activities on grizzly bears and grizzly bear habitat. Human activities within grizzly bear range will have effects, however subtle, on grizzly bears.

All previously mentioned "general management guidelines" are applicable coordination measures that should be considered when evaluating human activities in grizzly bear habitat. The following are additional species specific guidelines.

1. Avoid human activities in identified grizzly bear habitat constituent elements or portions of constituent elements containing specific habitat values during the following seasonal use periods (see data summarization):

A.	Spring habitat (concentrated use areas)	April 1 - June 30
B.	Alpine feeding sites	July 1 - Sept. 15
C.	Subalpine fir/whitebark pine habitat types	Aug. 1 - Nov. 30
D.	Denning habitat	Oct. 15 - Apr. 15

2. Avoid human activities in grizzly bear habitat components which provide important food sources during spring and early summer, April 1 - July 15. These habitat components include riparian shrub types, *Populus* stands, wet meadows, sidehill parks, and avalanche chutes. Maintain an undisturbed zone of at least 1/2 mile between activities and the edge of these habitat components where many important bear foods occur.

3. Establish flight patterns in advance when activities require the use of helicopters. Flight patterns should be located to avoid seasonally important grizzly bear habitat constituent elements and habitat components during the designated seasonal use periods.

4. No seismic or exploratory drilling activities should be conducted within a minimum of one mile of den sites during the October 15 - April 15 period (Reynolds, P.E. et al, 1983).

5. Seismic permits should include a clause providing for cancellation or temporary cessation of activities, if necessary, to prevent grizzly/human conflicts.

6. Scheduling of well drilling on adjacent sites, within important grizzly bear use areas, should be staggered to provide a disturbance free area for displaced bears.

7. Pipeline construction required for the development of a gas or oil field should be condensed into the shortest time frame possible and subject to seasonal restrictions when conducted in important grizzly bear habitat.

8. Field operation centers associated with seismic or oil/gas exploration activities should be placed carefully to avoid seasonally important habitat components or constituent elements. Such placement of sites is necessary in order to avoid direct or potential conflicts between man and grizzly bear.

9. Retain frequent dense cover areas adjacent to roads for travel corridors and security cover necessary to protect important habitat components. Three sight distances are desirable to provide visual security for grizzlies. A sight distance is the average distance at which a grizzly or other large animal is essentially hidden from the view of an observer by vegetation cover. The same security cover guidelines also applies to timber harvest units.

10. No off-duty work camps will be allowed within occupied seasonally important constituent elements.

11. Incinerate garbage daily or store in bear proof containers and remove to local landfill dumps daily.

12. Commercial activities permitted on public land should be planned and coordinated to avoid conflicts with grizzly bear trapping operations being conducted under the monitoring program. General public use of areas where trapping operations are active will be controlled through appropriate administrative actions by the agencies involved.

The following are grizzly bear management guidelines specifically oriented toward livestock grazing:

1. Livestock grazing on riparian plant communities should be deferred until after July 1.

2. In pastures grazed after July 1, cattle should be removed before the amount of the riparian forage base is reduced by 50 percent by either grazing or structural damage.

3. Exceptions to the July 1 entry date can be made when a pasture is part of a grazing system (for example, rest rotation or deferred rest rotation) that does not cause a decrease in the condition or size of the riparian plant communities.

4. In riparian habitats that receive high amounts of bear use, fencing to exclude livestock grazing and trampling may be necessary where livestock turn-out dates prior to July 1 are allowed.

5. Boneyards and livestock dumps are prevalent along the East Front and are frequented by grizzly bears. Ranchers and landowners should be encouraged to place carcasses of dead livestock and garbage on remote areas of their land. Dead cows and calves should be hauled a considerable distance from calving grounds to discourage bears from feeding on carion and newborn calves.

6. Options given in the IGBG for sheep allotments will be followed: "On sheep allotments where grizzly — livestock depredation has been authenticated, adjustments will be made for the primary purpose of grizzly bear conservation. The following options are available:

   (a) change the season of use, bedding practices, or grazing area to avoid known problem areas or other habitat important to grizzlies in time and space;

   (b) change the class of livestock from sheep to cattle if the range is suitable for cattle; or

   (c) remove all livestock and close the allotment. Vacant sheep allotments will not be restocked with sheep."

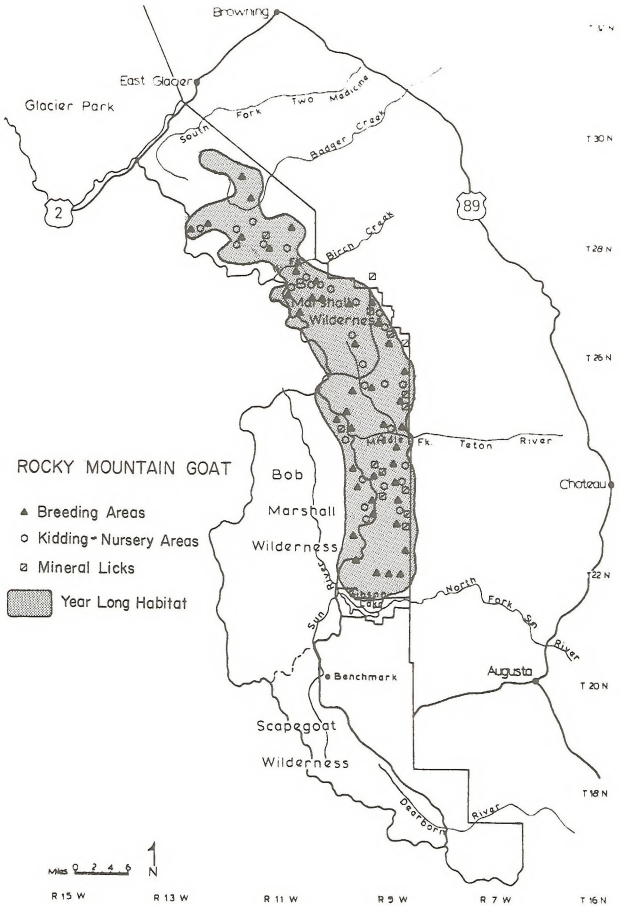
In addition to the guidelines listed above for livestock grazing practices, the following research/ management recommendations are presented; and will be considered as allotment management plans are updated.

1. The condition and trend of all riparian plant communities and their production of *Angelica arquta, Heracleum lanatum*, and *Osmorhiza occidentalis* need to be determined on all East Front public lands grazed by livestock.

2. For pastures where the condition of riparian plant communities needs improving, the construction of special use pastures is recommended. A special use pasture should be constructed where large areas of riparian vegetation are enclosed so an adequate forage base will be available to allow for stocking rates compatible with livestock operations. (Exclosures should be considered if riparian areas are too small.) These pastures should only be grazed after July 1, and the livestock should be removed before the utilization of the riparian forage base reaches 50% or the special use pastures should be incorporated into a deferred rest rotation grazing system similar to that described by Marlow (1985). Some other methods which may be used to reduce impacts to riparian include; development of alternate water sources, placement of salt away from riparian, and improved herding practices.

3. For riparian areas where the abundance of important plant species used by grizzlies for cover (*Populus tremuloides, Populus tricocarpa, Salix* spp., or *Betula* spp.,) or food (*Angelica arquta, Heracleum lanatum*, or *Osmorhiza occidentalis*) has been reduced, reestablishment should be attempted.

MOUNTAIN GOAT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MOUNTAIN GOAT

The Montana Mountain Goat Investigations along the East Front of the Rocky Mountains, funded by the Montana Department of Fish, Wildlife and Parks, the Lewis and Clark National Forest and the Allen Foundation, is the basis for formulating management guidelines (Thompson 1980; Tomasko 1980; Joslin 1986, 1983, 1982, 1981). Literature concerning wildlife (primarily mountain goats) and land use conflicts was also used in developing some of the guidelines.

The guidelines are heavily oriented toward disturbance related to oil and gas activity since that is the primary activity of concern now, however, other activities which may influence mountain goats are also addressed. The following guidelines are based on historic information from this area and data collected during the last four years. These guidelines represent the best information now available.

All previously mentioned "general management guidelines" are coordination measures that should be considered when evaluating human activities in mountain goat habitat. The following is adapted from the mountain goat investigations final report (Joslin, 1986) and provides species specific guidelines which are applicable to a variety of human activities.

1. Avoid human activities in identified mountain goat habitat during the following seasonal use periods:

   A. Occupied yearlong mountain goat habitat

      1) Kidding — nursery areas ..... May 1 - July 15
      2) Breeding areas ..... November 1 - December 31
      3) Winter range ..... October 15 - May 15

   B. Suitable low occupancy mountain goat habitat

      (Appropriate surveys of suitable mountain goat habitat will be made by a wildlife biologist to determine whether goats are present prior to initiation of a planned activity. If goat use is documented, the stratification will be changed to occupied yearlong mountain goat habitat and the listed guidelines will apply. If mountain goat use is not documented, then guidelines listed for transitional areas will apply.)

   C. Transitional mountain goat habitat

      (The area between occupied yearlong habitat through which mountain goats travel. Timing restriction apply to exploratory drilling, road construction and maintenance, timber harvest, off-road and trail vehicle travel and any other mechanized activity which extends beyond one week in duration.)

      October 15 - December 31
      and
      May 1 - June 30

2. Mineral licks used by mountain goats should have a no surface occupancy stipulation for a one-mile radius around the site (Joslin, 1984).

3. New mineral licks within mountain goat habitat should not be established without considering the safety of goats (Rideout, 1974).

4. Establish helicopter flight patterns at least one mile from mountain goat mineral licks during the May 1 - July 31 period (Joslin, 1984).

5. Restrict use of roads and trails which cross or come to within one-half mile of a mountain goat mineral lick to nonmotorized use during the May 1 - July 31 period.

6. Avoid constructing wells, pipelines or roads within 1 mile of occupied yearlong habitat.

7. Establish flight patterns in advance when activities require the use of helicopters. Flight patterns should be located to avoid seasonally important mountain goat habitat during the use periods designated above.

8. Exploratory well drilling should not occur within occupied habitat. Exploratory drilling on adjacent sites within Suitable and/or Transitional mountain goat habitat should be staggered to provide a disturbance-free area for displaced mountain goats.

9. Livestock use of mineral licks used by mountain goats should occur after July 1 or pasture use staggered so that adjacent licks are not used simultaneously by livestock.

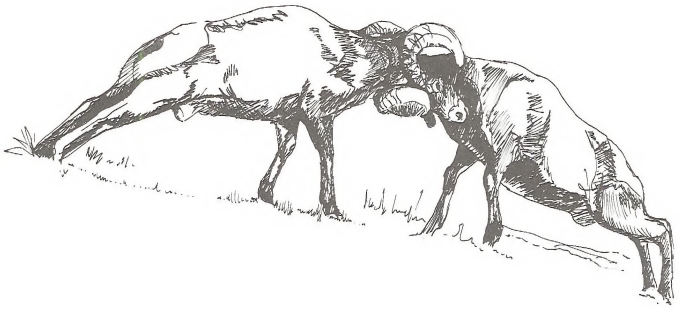
10. In occupied yearlong habitat, livestock grazing should be restricted to the period July 1 - October 15.

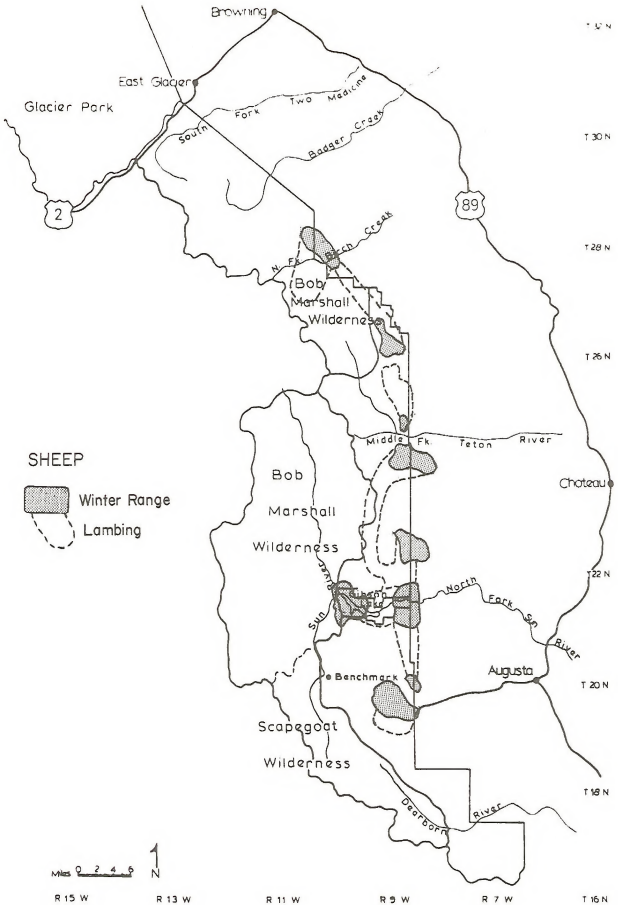
11. The level of livestock use in occupied habitat should not be increased, and grazing of domestic sheep should not occur.

12. No suppression of insects and disease should occur in occupied habitat unless adjacent resource values are threatened.

13. Timber harvest and road construction within occupied mountain goat habitat should be closely coordinated with the Montana Department of Fish, Wildlife and Parks to address the needs of mountain goats.

BIGHORN SHEEP

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BIGHORN SHEEP

The following guidelines are based on the best information available and are subject to change and/or modification. The majority of the guidelines are based on work done between Birch Creek and the Teton River by Andryk, 1983; between the Teton and Dearborn Rivers as part of the Rocky Mountain Front Wildlife Studies by Hook, 1981-1986; and on Region 4, Montana Department of Fish, Wildlife and Parks game management surveys.

The cumulative effects of all disturbances; oil and gas exploration and development, timber harvesting, livestock grazing and recreation must be considered when evaluating proposed activities. Potential conflicts can be minimized by adhering to the following guidelines.

1. Avoid disturbance related to human activities on identified important bighorn sheep habitat during the following seasonal use periods:

   A. Winter Ranges and rutting areas ..... September 1 - May 15
   B. Lambing areas and mineral licks ..... April 15 - June 30

2. Provide a one mile zone of no activity to separate each disturbance activity from an occupied bighorn sheep seasonal use area.

3. Require helicopters to maintain heights of not less the 1,300 feet (400 meters) from all ground surfaces, except in designated landing zones.

4. Avoid well drilling or pipeline construction within one mile of bighorn sheep winter ranges and rutting, lambing and mineral lick areas.

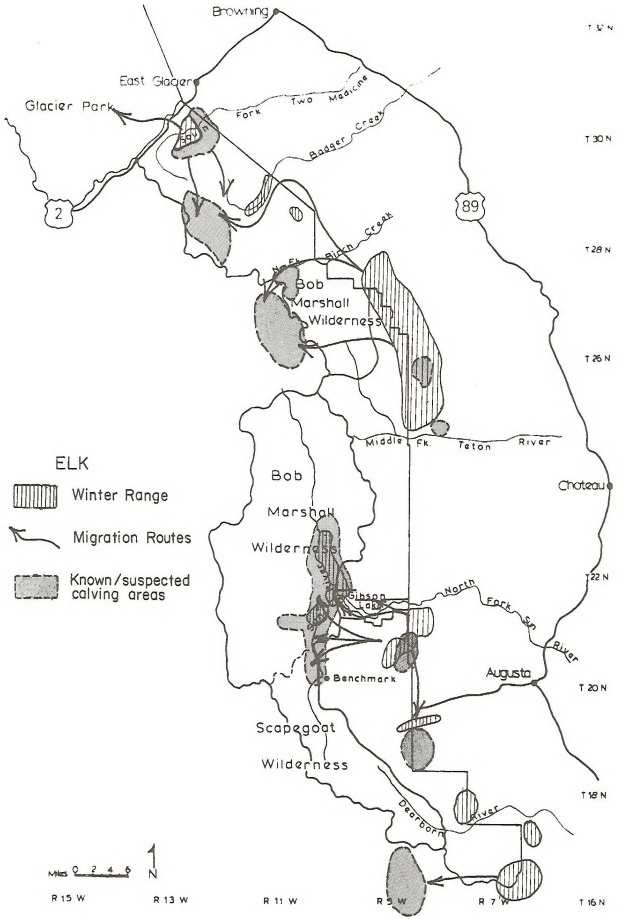
5. Avoid road construction within one mile of winter ranges and rutting, lambing and mineral lick areas, unless access is restricted during bighorn sheep seasonal use periods.

6. Restrict cattle grazing to a period of July 1 to October 15 on bighorn sheep habitat.

7. Continue to protect bighorn sheep winter-spring ranges from domestic livestock grazing.

8. Avoid timber harvest or firewood cutting on winter ranges and rutting, lambing and mineral lick areas during bighorn sheep seasonal use periods.

ELK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Fork
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N. Fk.
Birch Creek
Bob
Marshall
Wilderness
Middle Fk. Teton River
Choteau
Bob
Marshall
Wilderness
Gibson
Dam
North Fork Sun River
Benchmark
Augusta
Scapegoat
Wilderness
Dearborn River
ELK
Winter Range
Migration Routes
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ELK

The guidelines described below are heavily oriented toward disturbance related to oil and gas activity, especially seismographic work, since that was the primary activity occurring during the study period. As the monitoring program proceeds, additional information will be gathered pertaining to other activities which may influence elk and elk habitat. We anticipate expanding the guidelines to address other disturbance related activities such as livestock grazing, hard rock mining, and increased recreation, etc. The Montana Cooperative Elk-Logging Study management recommendations and these guidelines will be followed as appropriate when considering elk and timber harvesting proposals.

The following guidelines are based on the best information available at this time and are considered tentative and subject to change. The majority of the guidelines are based on work done in the Badger-Two Medicine area of the Rocky Mountain Front by G. Olson (1981) in cooperation with the Rocky Mountain Front Wildlife Monitoring/Evaluation Program (1980). This report is also referenced for the "data summarization" portion of the elk guidelines.

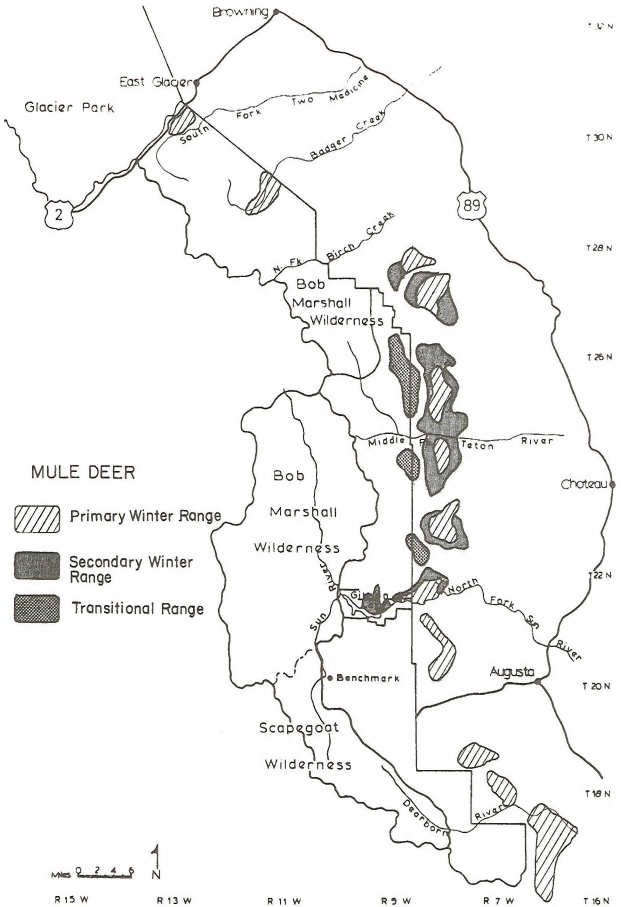
All previously mentioned "general management guidelines" are applicable coordination measures that should be considered when evaluating human activities in elk habitat. The following are additional species specific guidelines.

1. Avoid disturbance related to human activities on identified important elk habitat during the following seasonal use periods:

   A. Winter ranges ..... December 1 - May 15
   B. Calving areas and spring migration corridors ..... May 1 - June 30

2. Increased levels of disturbance caused by human activities (i.e., seismographic surveys, timber harvesting, exploratory well drilling, etc.) should not be permitted to occur simultaneously in adjacent drainages within seasonally important elk habitat.

MULE DEER


Browning
East Glacier
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South Fork Two Medicine
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89
W. Fk. Birch Creek
Bob Marshall Wilderness
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Choteau
Bob Marshall Wilderness
Sun River
North Fork Sun River
Augusta
Benchmark
Scapegoat Wilderness
Dearborn River
MULE DEER
Primary Winter Range
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Transitional Range
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T 16 N

MULE DEER

The East Slope Rocky Mountain Front Mule Deer Study and Investigation is the basis for formulating management guidelines. Other information available for developing includes Region 4 MDFW&P game management surveys and various surveys by the BLM and FS.

The guidelines are heavily oriented toward disturbance related to oil and gas activity since that was the primary activity of concern during the monitoring period. We anticipate expanding the guidelines to other activities such as livestock grazing, recreational use and timber harvesting.

Studies to date have identified primary and secondary winter range, transitional range, migration corridors, and the tentative yearlong herd ranges associated with each wintering population unit. Population information applies only to units with winter ranges along the east slope from Montana Highway No. 200 to Birch Creek.

The following guidelines are based on the best information available at this time and are considered tentative and subject to change. We anticipate periodic updates as new data becomes available.

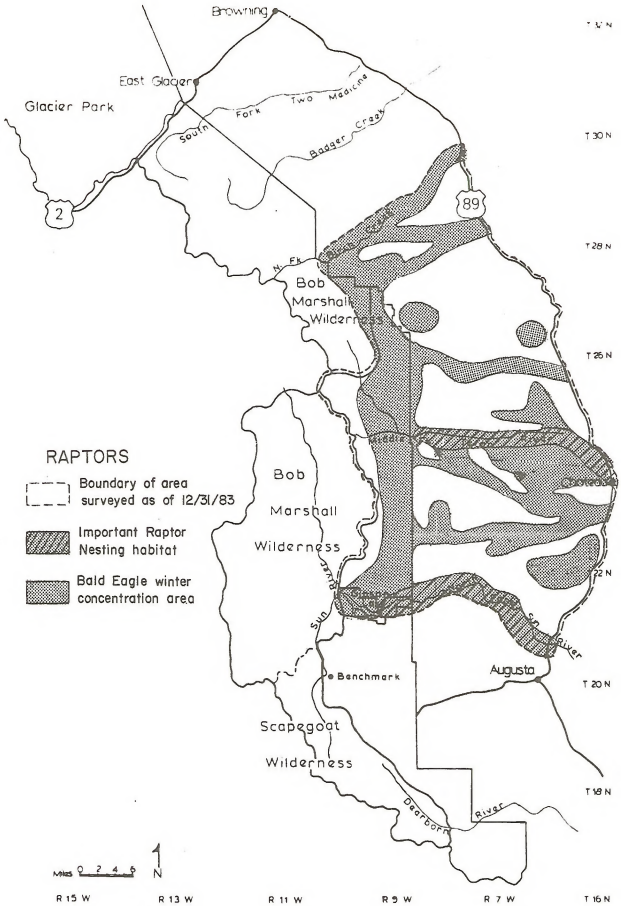
All previously mentioned "general management guidelines", unless specifically identified as inapplicable to mule deer, should be considered when evaluating human activities in mule deer habitat. The following are additional species specific guidelines.

1. Avoid disturbance related to human activities on identified important mule deer habitat during the following seasonal use periods:

   A. Primary and secondary winter ranges ..... December 1 - May 15
   B. Transitional ranges ..... October 15 - December 31
   C. Migration corridors ..... May 15 - June 15

2. Population units should be closely monitored to detect changes in population size, productivity, mortality, and distribution associated with changes in land use. Intensive or high level monitoring of a population unit (with comparable monitoring of at least one other unit as a control) should be initiated if production density equals or exceeds one well per section on at lease 25 percent of a primary, secondary, or transitional range or 10 percent of a high density primary winter range.

RAPTORS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T 16 N
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R 11 W
R 9 W
R 7 W
RAPTORS
Boundary of area surveyed as of 12/31/83
Important Raptor Nesting habitat
Bald Eagle winter concentration area
Miles 0 2 4 6
N

RAPTORS

The following raptor guidelines were developed from 1982-1984, Rocky Mountain Front Raptor Study, previous studies from this area, and current literature. These guidelines stated herein are subject to revision as new information becomes available.

General Raptor Guidelines

A variety of raptors, both diurnal and nocturnal, use the Rocky Mountain Front during some part of their annual activities. Because of wide differences in their inherent behavior and broad spectrums of habitats utilized, consideration should be given to all of the following area wide general guidelines.

1. Develop public information and education programs which are tailored specifically to raptors of the Rocky Mountain Front.

2. Maintain or enhance all riparian habitats.

3. Do not allow the use of chlorinated hydrocarbon insecticides.

4. Promote regulations intended to prevent accidental trapping of raptors.

5. Discourage and/or carefully plan all human related activities that will occur in key raptor habitats or key use areas, which result in long-term habitat alteration.

6. Restrict the use of exposed bait poisoning of rodents or predators in areas that are seasonally important to raptors.

7. Plan telephone and power lines to reduce the possibility of raptor injury or mortality. Modify existing lines which are documented to cause raptor mortality. Install markers on wires spanning rivers, canyons, and other areas heavily used by raptors to reduce collision with the wires.

8. Do not allow surface-charge seismic exploration or other use of explosives within 1 mile of known occupied raptor nests.

9. Avoid human disturbances at nesting territories during sensitive nesting phases (see tables 1, 2, and 3).

10. Due to the dynamics of raptor biology and ecology, site specific surveys should be completed during management activity evaluation. Adequate nest searches should be conducted for species involved, utilizing techniques which will maximize success in locating them.

11. Site specific habitat management plans should be developed for unique or special habitat features, or areas, which tend to concentrate raptors in the nesting, wintering or migration periods.

12. Raptor nest locations should only be revealed to authorized personnel.

ENDANGERED AND THREATENED RAPTOR SPECIES GUIDELINES

Bald Eagle Guidelines

CURRENTLY OCCUPIED NESTING HABITAT

No currently occupied bald eagle territories have been located in the Rocky Mountain Front area.

1. Should nesting bald eagles be discovered, site specific nest management plans should be developed for each nesting territory. References used to develop these plans should be: The Approved Pacific States Recovery Plan and the Montana Bald Eagle Management Guidelines.

POTENTIAL NESTING HABITAT

Recovery of the bald eagle depends on consideration of habitat needs not only for identified key use areas, but also potential habitats. Historical evidence suggests bald eagles nested along riparian systems in the Rocky Mountain Front area.

1. Secure significant potential nesting habitat through lease, exchange, easement, cooperative agreements or purchase.

2. Maintain and improve quantity, quality and availability of prey base in riparian and aquatic zones.

3. Maintain or improve mature and old growth forested habitat within 1.0 mile of water bodies that possess good supplies of fish and/or waterfowl.

4. Because the Montana bald eagle nesting population is expanding, potential habitats should be monitored annually for the presence of nesting territories.

NON-NESTING SEASON

Spring and fall migration habitat, communal roosts, traditional key use areas and winter habitat are essential elements in the maintenance and recovery of the species.

1. Encourage provision of a sufficient and safe food base for migrating and wintering eagles.

2. Identify key use areas, and employ timber best management practices on timber resources when necessary to maintain or enhance the integrity of these sites.

3. Avoid disturbance which may cause eagles to flush from communal roosts, feeding sites and perches during migration and at wintering sites.

4. General migration periods for bald eagles are as follows: spring migration from January 15 to April 30; fall migration from October 1 to December 15.

Peregrine Falcon Guidelines

CURRENTLY OCCUPIED NESTING HABITAT

No currently occupied peregrine falcon nesting eyries have been located in the Rocky Mountain Front area.

1. Should nesting peregrines be discovered, site specific nest management plans should be developed for each nesting territory. References used to develop these plans should be: The Approved Recovery Plan and Guidance from the Montana Peregrine Falcon Working Group.

POTENTIAL NESTING HABITAT

Historical evidence suggests peregrine falcons nested in the Rocky Mountain Front area.

1. Secure specific significant potential nesting and foraging habitat through lease, exchange, easement, cooperative agreements or purchase.

2. Maintain and improve quantity, quality and availability of prey base within a 10 mile radius of potential nesting habitats. Emphasis should be placed on habitat maintenance or enhancement of riparian and wetland habitats.

3. Maintain or enhance avian prey base in the Rocky Mountain Front area.

4. Portions of potential peregrine habitats which were identified on the Rocky Mountain Front (DuBois 1984, Supplementary Maps) should be monitored on an annual basis for peregrine falcon nest territories.

NON-NESTING SEASON

1. Encourage provision of a sufficient and safe food base for migrating and wintering peregrines.

2. Identify key use areas and employ best management practices to maintain or enhance the integrity of these sites.

RAPTORS OF SPECIAL INTEREST OR CONCERN

The golden eagle, Cooper's hawk, long-eared owl, northern pygmy owl, northern saw-whet owl, burrowing owl, northern goshawk, ferruginous hawk, prairie falcon and merlin all occur or may occur in the Rocky Mountain Front area and have been identified (by Flath, MDFWP, 1984) as species of special interest or concern in Montana.

Guidelines for Raptors of Special Interest or Concern

CURRENTLY OCCUPIED NESTING HABITAT

1. Avoid human disturbance within recommended buffer zone area (table 1) during sensitive nesting phases (table 2 and table 3).

2. Monitor threats and changes to nesting territories.

POTENTIAL NESTING HABITATS

1. Maintain or enhance riparian habitats.

2. Maintain or enhance special habitat features, i.e., cliffs, snag areas, etc.

3. Manage coniferous forest so as to maintain segments of old growth timber.

NON-NESTING SEASON

1. Identify key use areas, such as migration corridors, winter roosts, foraging areas, etc.

2. Monitor key use areas for threats or change.

Guidelines for Unique or Special Habitat Features

Unique and/or special habitat features lend diversity to environments otherwise dominated by broad plant communities. These habitat features can play on important role in the enrichment of wildlife diversity and wildlife densities in an area. Such is the case in the Rocky Mountain Front Raptor Study Area (DuBois, 1984), where cliffs, riparian areas and coniferous forest were the most commonly used habitats by nesting raptors, yet collectively these habitats comprised only 15% of the total land base.

1. Management activity involving alteration or disturbance of unique or special habitat features should be carefully evaluated on a case-by-case basis.

2. Management should be directed to protection and/or enhancement of all unique or special habitat features.

ENHANCEMENT ACTIVITIES FOR RAPTORS

The following are suggestions for programs that would have the potential to enhance raptor populations on the Rocky Mountain Front.

1. Implement land management plans that perpetually protect and provide habitat important to raptors and their prey.

2. Install artificial nesting platforms in areas of extensive grasslands to provide nesting structures for golden eagles, red-tailed hawks and ferruginous hawks, in areas where it can be demonstrated that populations of these species will benefit without impacting other special interest species (such as black-footed ferrets and Swainson's hawks) through predation or competition.

3. Encourage planting and maintenance of shelter belts in agricultural areas. Shelter belts have the potential to provide nesting areas for Swainson's hawks, red-tailed hawks, merlins, great horned owls and long-eared owls.

4. Install dikes to retain water on areas that are presently exposed as mud flats on the upper ends of reservoirs which are severely dewatered during the summer (Eureka, Bynum and Nilan Reservoirs). This would greatly enhance waterfowl and shorebird production which would in turn provide a better prey base for prairie falcons and peregrine falcons. This would also reduce blowing dust from these areas. Islands should be constructed in the dike ponds to provide nesting areas for waterfowl.

5. Revegetate clear-cuts and disturbed areas with a diversity of native plants, and encourage reseeding of highly erodible croplands to native vegetation to maintain a diverse prey base.

6. Implement a snag management policy that will provide nesting habitat for cavity-nesting raptors such as American kestrels and saw-whet owls.

The failure of adult raptors to return to the nest, eggs or young after human interference of an unfamiliar nature is both serious and unpredictable. Because of this unpredictability, precautions should always be taken around any occupied nest or potential nesting territory.

Following are general recommended nest buffer zones related to various human activities. These activities and recommended zones are not inclusive, details of terrain, vegetation, type and duration and familiarity of disturbance, specific temperament of individual birds, phase of nesting cycle, etc., all enter into determining the actual needed buffer zone at a given nest site. Preclusion of human activity at a given nest territory should be tempered with as many variables as possible, and on a site specific basis.

Table 1

Activity	Recommended buffer zones
Off-road vehicle use	1/4 mile - 1/2 mile
Camping	1/4 mile - 1/2 mile
Hiking	1/4 mile - 1/2 mile
Rock climbing	1/2 mile - 3/4 mile
Road Construction	1/2 mile - 1 mile
Controlled burning	1 mile - 2 miles
Trail clearing	1/4 mile - 1/2 mile
Building/construction	1/2 mile - 3 miles
Mining/heavy equipment or blasting	1 mile - 3 miles
Logging	1/2 mile - 1 mile
Aircraft flights (low altitude)	1/4 mile - 1 mile

Nesting chronology for most raptors can be divided into 5 phases. The following summarized each phase, general sensitivity to disturbance and comments. This table should be used with table 1 to temper activity and zone buffers.

Table 2

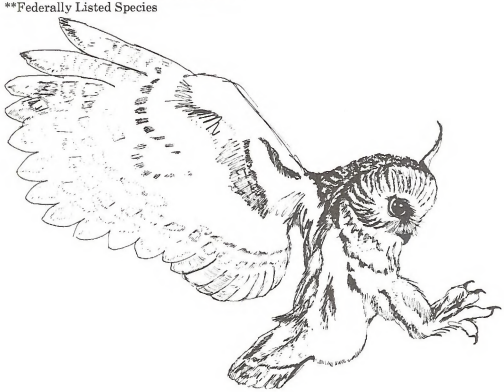
PHASE	ACTIVITY	SENSITIVITY TO DISTURBANCE	COMMENTS
I	Nest building includes courtship behavior	Extremely Sensitive, period most likely to desert.	1. Most critical time period from the standpoint of desertion.
II	Egg laying	Extremely Sensitive, period most likely to desert.	2. Human disturbance of even limited duration may cause desertion, not only of nest sites, but also of long established territories.
III	Incubation	Extremely Sensitive, period most likely to desert.	3. Nest site tenacity is weakest on new territories or when the birds first establish their territories. 4. Flushed birds may puncture, crush or eject eggs from nest. 5. Flushed birds leave eggs unattended. Eggs are susceptible to cooling, loss of moisture, over heating and predation.
IV	Hatching and nestling rearing	Moderately sensitive	1. As hatching/rearing approaches, most birds become tenacious to clutches of eggs. 2. Generally, uncommon to desert a nest after young have hatched.
V	Post fledging	Moderately	3. First half of nestling period, young most susceptible to elements. 4. Flushed birds may trample young or eject them from nest. 5. Unattended nestlings may chill or overheat, are susceptible to predation. 6. Nestlings may miss feedings. May affect overall health of young birds. 7. Premature Fledging - Threat to young prematurely leaving nest due to disturbance.

Approximate nesting dates for some raptors that occur in the Rocky Mountain Front, North central Montana.

Table 3

Species	Approximate Dates of Nesting Season
Turkey vulture	April 15 - August 1
* Golden eagle	February 1 - July 30
** Bald eagle	February 15 - August 15
Northern harrier	April 1 - July 15
Sharp-shinned hawk	April 15 - August 15
* Cooper's hawk	April 15 - August 15
* Northern goshawk	April 15 - August 15
Red-tailed hawk	April 15 - August 15
Swainson's hawk	May 1 - September 15
* Ferruginous hawk	April 1 - July 30
American kestrel	May 1 - August 15
* Merlin	April 15 - August 15
* Prairie falcon	March 15 - July 30
** Peregrine falcon	April 15 - August 1
Short-eared owl	March 1 - August 1
Long-eared owl	March 1 - August 1
Great horned owl	January 1 - August 1
Great gray owl	March 1 - August 15
Eastern screech owl	March 1 - July 1
Northern pygmy owl	March 1 - July 15
* Northern saw-whet owl	March 1 - August 30
* Burrowing owl	March 15 - July 15

*Species of Special Interest or Concern
**Federally Listed Species



DATA SUMMARIZATION

GRIZZLY BEAR MONITORING DATA SUMMARIZATION

Rocky Mountain Front

MANAGEMENT OBJECTIVES

Under authority of the Endangered Species Act, the grizzly bear *(Ursus arctos horribilis)* was listed as a threatened species by the U.S. Fish and Wildlife Service in 1975. In 1982 a Grizzly Bear Recovery Plan was adopted. This plan presents a biologically sound program that will result in the recovery of the species to a population level that will no longer require protection under the Endangered Species Act. The Recovery Plan is currently being revised and will identify the population and habitat parameters needed to judge recovery. The Northern Continental Divide Grizzly Bear Management Subcommittee has initiated a trend monitoring program that will monitor production, occupancy, habitat, and mortality as outlined below. Information collected through the trend monitoring program will be used to determine whether the grizzly bear has reached recovery levels and whether the habitat is being managed to support a recovered population.

Monitoring Parameters

Parameter		Methodology
I.	Production	Unduplicated count of females with cub(s) of the year
II.	Occupancy	Count females with offspring
III.	Habitat	Utilize Cumulative Effects Model
IV.	Mortality	Inventory all deaths. Percent based on 50 CFR 17.40 and Montana Department of Fish, Wildlife and Parks — Environmental Impact Statement.

Human activities within grizzly bear habitat will have impacts, however subtle, on grizzly bears. These impacts on bears have been well documented in the literature. Human activities which can affect grizzlies and/or their habitat need to be designed to provide for the grizzly bears need and minimize grizzly-human conflict situations. Successful management of grizzlies will be dependent upon our knowledge of the animal, a keen understanding of the effects of human activities on grizzlies, and our sensitivity as land managers toward the species concerned.

POPULATION AND DENSITIES

Grizzly bear densities varied from one bear per 0.6 mile^2 to one bear per 110 mile^2 in North American (Dood et. al., 1986). In the Northern Continental Divide Ecosystem densities varied from one bear per 6 mile^2 on the North Fork of the Flathead to one bear per 19 mile^2 in the Mission Mountains (Dood, et. al., 1986). On the Rocky Mountain East Front density estimates from the Deep Creek-Birch Creek area, 1980-86 ranged between one bear per 21.8 mile^2 to one bear per 17.2 mile^2 (Aune and Brannon, 1987). The average density for this six year period was one bear per 20 mile^2. (Table 1)

Table 1. Density estimates for the Deep Creek-Birch Creek Core Study Area, 1980-1986

Year	(A) No. Marked Bears	(B) No. Marked & Observed Bears	Area[1] (1467 km²) Density A	Density B
1980	16	27	91.7	54.3
1981	18	26	81.5	56.4
1982	20	33	73.4	44.5
1983	22	26	66.7	56.4
1984[2]	25-28	33	58.7-52.4	44.5
1985[2]	20-23	29	73.4-63.8	50.6
1985[2]	9-21	26	No est.	56.4
Average			74.2-71.6	51.9

[1] Adult Bear Polygon consisting of 98 percent locations excluding unsuitable eastern habitats and subadult bears, 1977-1984.

[2] Significant decreased field effort in core area — No trapping.

Densities of bears in the Antelope Butte, Ear Mountain-Pine Butte, and Elk-Smith Creek areas may occasionally be as high as one grizzly per one to two miles squared for brief periods as bears concentrate on key spring ranges.

Population estimates derived from extrapolating these density estimates to the 1834 mile² of grizzly habitat on the Front yields a population range of 84-107 grizzly bear. The average population estimate for the 1980-1986 period is 92 grizzly bear. It is possible the densities of grizzlies are not uniform across the entire Front. The Badger-Two Medicine and the Sun River South areas may have lower population densities than the Teton Birch Creek area.

Population interchange occurs between the East Front and Glacier Park as well as between the adjacent National Forests to the west and south of the East Front. The East Front grizzly bears are a part of a wholly larger Northern Continental Divide population which is connected to Canada via Glacier National Park.

Further discussion of populations and densities are presented in Schallenberger and Jonkel (1980), Aune and Stiver (1982, 1983), Aune et. al., (1984, 1986), Aune (1985), and Aune and Brannon (1987).

HABITAT

Management stratifications and various habitat mapping systems have been developed and used by land management agencies on the Rocky Mountain Front.

Management stratificant mapping using the Interagency Grizzly Bear Guidelines (Federal Register, Vol. 51, No. 228) has shown that all federal and state controlled lands within occupied grizzly range along the Rocky Mountain Front meet the criteria to be classified as management situation 1, 2 or 3 as defined below:

A. Management Situation 1

1. *Population and habitat condition.* The area contains grizzly population centers (areas key to the survival of grizzly where seasonal or year-long grizzly activity, under natural, free-ranging condition is common) and habitat components needed or the survival and recovery of the species or a segment of its population. The probability is very great that major Federal activities or programs may affect (have direct or indirect relationships to the conservation and recovery of) the grizzly.

2. *Management direction.* Grizzly habitat maintenance and improvement (improvement does not apply to Park Service), and grizzly-human conflict minimization will receive the highest management priority. Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values compete. Land uses which can affect grizzlies and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated. Grizzly-human conflicts will be resolved in favor of grizzlies unless the bear involved is determined to be a nuisance. Nuisance bears may be controlled through either relocation or removal but only if such control would result in a more natural, free-ranging grizzly population and all reasonable measures have been taken to protect the bear and/or its habitat (including area closures and/or activity curtailments).

B. Management Situation 2

1. *Population and habitat conditions.* Current information indicates that the area lacks distinct population centers; highly suitable habitat does not generally occur, although some grizzly habitat components exist and grizzlies may be present occasionally. Habitat resources in Management Situation 2 either are unnecessary for survival and recovery of the species, or the need has not yet been determined that habitat resources may be necessary. Certain management actions are necessary. The status of such areas is subject to review and change according to demonstrated grizzly population and habitat needs. Major Federal activities may affect the conservation of the grizzly bear primarily in that they may contribute toward (a) human-caused bear mortalities or (b) long-term displacement where the zone of influence could affect habitat use in Management Situation 1.

2. *Management direction.* The grizzly bear is an important, but not the primary, use of the area. In some cases, habitat maintenance and improvement may be important management considerations. Minimization of grizzly-human conflict potential that could lead to human-caused mortalities is a high management priority. In this management situation, managers would accommodate demonstrated grizzly populations and/or grizzly habitat use in other land use activities if feasible, but not to the extent of exclusion of other uses. A feasible accommodation is one which is compatible with (does not make unobtainable) the major goals and/or objectives of uses. Management will at least maintain those habitat conditions which resulted in the area being stratified Management Situation 2. When grizzly populations and/or grizzly habitat use and other land use needs are mutually exclusive, the other land use needs may prevail in management consideration. In cases where the need of the habitat resources for recovery has not yet been determined, other land uses may prevail to the extent that they do not result in irretrievable/irreversible resource commitments which would preclude the possibility of eventual restratification to Management Situation 1. If grizzly population and/or habitat use represents demonstrated needs that are so great (necessary to the normal needs or survival of the species or a segment of its population) that they should prevail in management considerations, then the area should be reclassified under Management Situation 1. Managers would control nuisance grizzlies.

C. Management Situation 3

1. *Population and habitat condition.* Grizzly presence is possible but infrequent. Developments, such as campgrounds, resorts or other high human use associated facilities, and human presence result in conditions which make grizzly presence untenable for humans and/or grizzlies. There is a high probability that major Federal activities or programs may affect the species' conservation and recovery.

2. *Management direction.* Grizzly habitat maintenance and improvement are not management considerations. Grizzly-human conflict minimization is a high priority management consideration. Grizzly bear presence and factors contributing to their presence will be actively discouraged. Any grizzly involved in a grizzly-human conflict will be controlled. Any grizzly frequenting in an area will be controlled.

The Rocky Mountain Front bear habitat was divided into six (6) bear management units (Table 2) (Figures 1-6). Each unit was distinguished by similarity of habitats and somewhat distinct bear sub-populations as determined by radio telemetry. Each unit has year long grizzly habitat and is occupied year long.

Constituent element maps were created for each bear management unit (Figures 1-6). Constituent elements are areas which include combinations of biological and physical factors that are considered essential for the recovery and conservation of a threatened or endangered species (50 CFR Part 424 — Listing Endangered and Threatened Species and Designating Critical Habitat). Grizzly bear constituent elements are: Denning habitat, Spring habitat, Summer habitat, Fall habitat, and space. The year-long needs of grizzly bears can be met when all constituent elements are adjacent to each other and accessible to grizzly bears in the area. Many major developments and management actions can reduce the availability of any of the constituent elements.

Seasons of use for constituent elements are:

Spring habitat	April 1 - June 30
Summer habitat	June 15 - September 15
Fall habitat	September 1 - November 30
Denning habitat	October 15 - April 15

Another possible constituent element for grizzly bears are breeding areas. Evidence suggests that breeding ranges may be synonymous with spring range in most instances, but some females chose secluded breeding areas outside of spring habitat which are then of critical importance to them. Breeding areas are important from May 1 to July 15. Some breeding ranges have been identified and mapped for the Rocky Mountain Front.

Table 2. Area's of Bear Management Units and Spring and Denning Habitat for each unit.

Bear Management Unit	Total Area (km²)	Denning Habitat (km²)			Spring Habitat (km²)		
		Lewis & Clark Forest	Non-Forest	Total	Lewis & Clark Forest	Non-Forest	Total
Badger-Two Med.	885.8	159.0 (99.8)[1]	0.3 (0.2)[1]	159.3 (18.0)[2]	181.8 (36.1)[3]	321.8 (63.9)[3]	503.6 (56.9)[2]
Teton-Birch Cr.	870.2	210.2 (99.4)	1.3 (0.6)	211.5 (24.3)	94.5 (18.5)	417.6 (81.5)	512.1 (58.8)
N. Fk. Sun River	650.1	308.0 (100.0)	0.0 (0.0)	308.0 (47.4)	204.5 (100.0)	0.0 (0.0)	204.5 (31.5)
Teton-Sun River	792.5	116.9 (92.2)	9.9 (7.8)	126.8 (16.0)	52.5 (20.0)	209.7 (79.9)	262.2 (33.1)
S. Fk. Sun River	808.1	415.7 (96.8)	13.9 (3.2)	429.6 (53.2)	224.4 (56.6)	171.9 (43.4)	396.3 (49.0)
Dearborn-Elk Cr.	743.3	131.5 (95.9)	5.6 (4.1)	137.1 (18.4)	91.6 (21.5)	333.9 (78.5)	425.5 (57.2)
Total	4750.0	1341.3 (9.4)	31.0 (0.6)	1372.3 (28.9)	849.3 (36.9)	1454.9 (63.1)	2304.2 (48.5)

[1] Percent of Total Denning Habitat within BMU
[2] Percent of Total BMU Area
[3] Percent of Total Spring Range within BMU

FIGURE 1. CONSTITUENT ELEMENT MAP, 1986

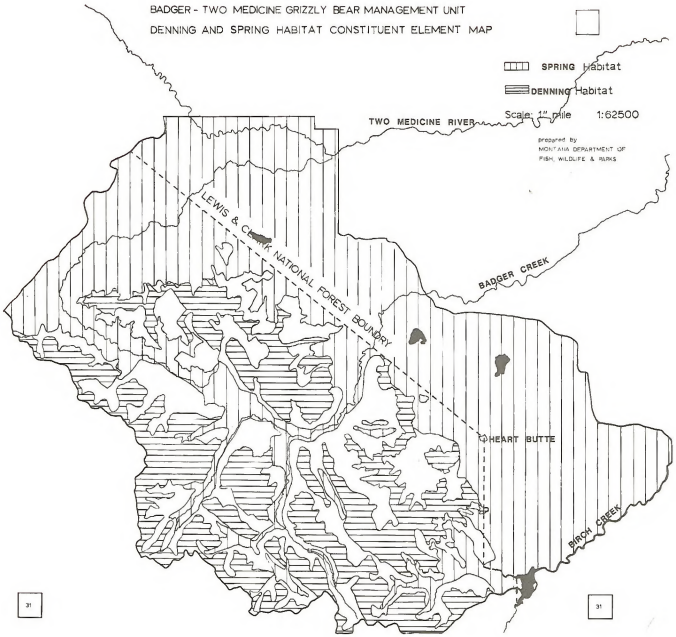


FIGURE 2. CONSTITUENT ELEMENT MAP, 1986

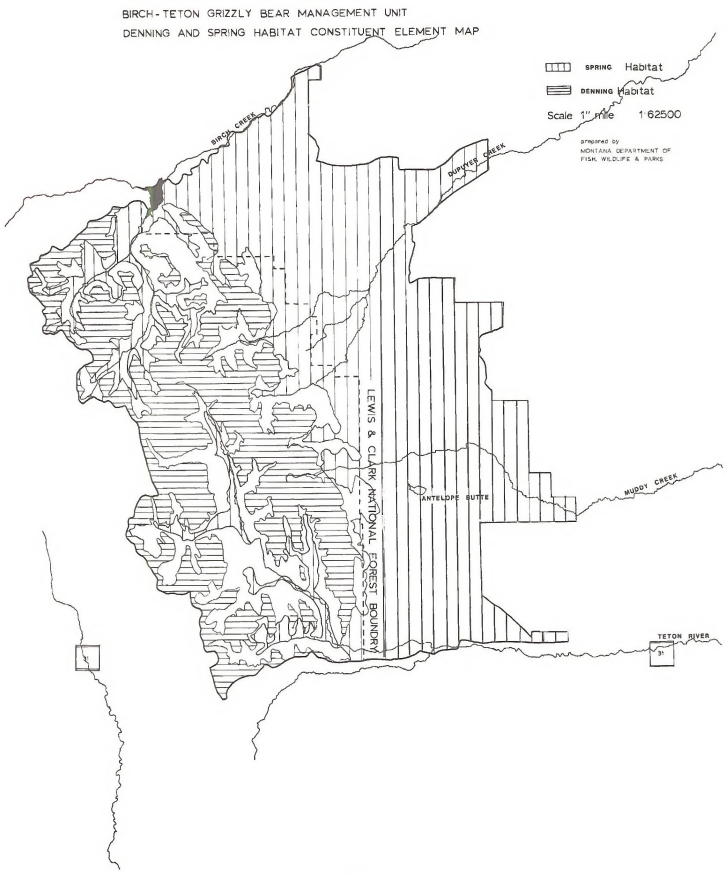


FIGURE 3. CONSTITUENT ELEMENT MAP, 1986

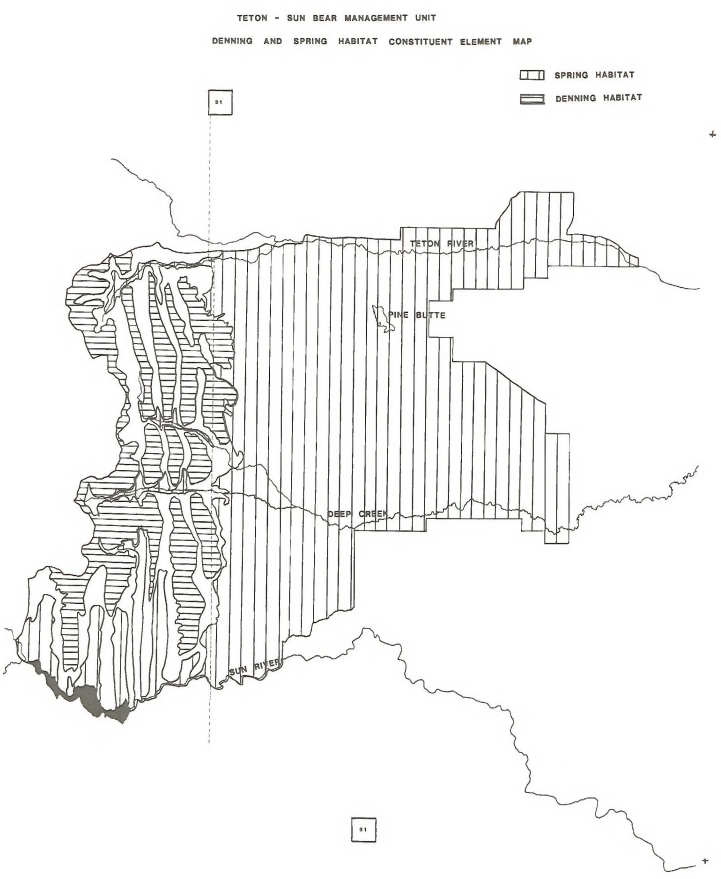


FIGURE 4. CONSTITUENT ELEMENT MAP, 1986

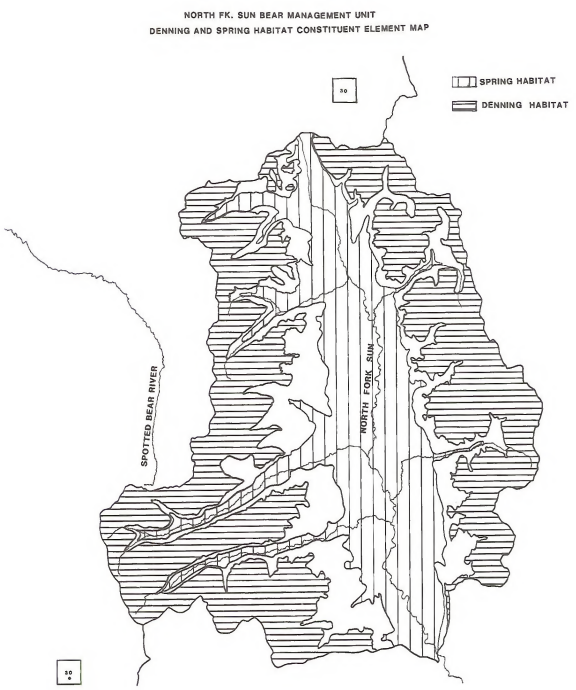


FIGURE 5. CONSTITUENT ELEMENT MAP, 1986

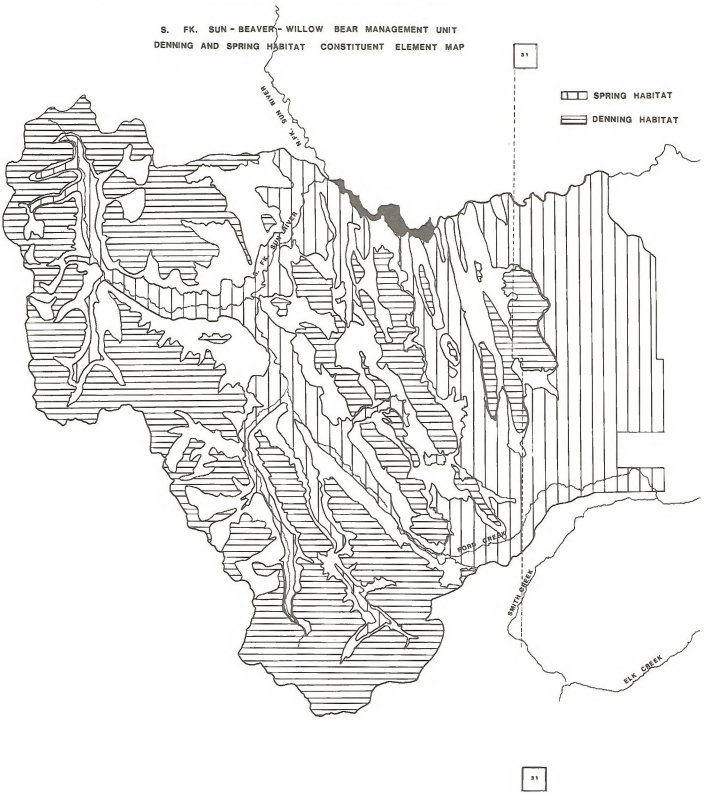
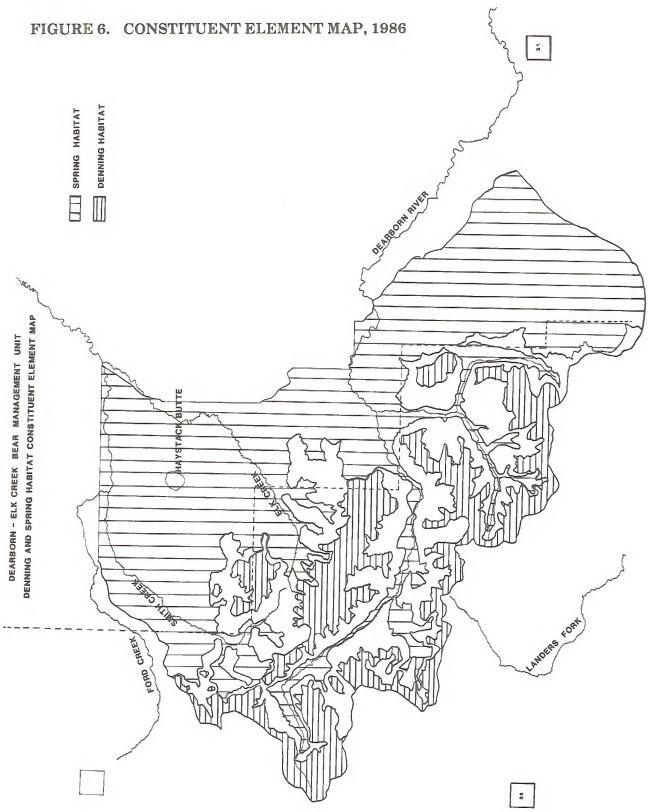


FIGURE 6. CONSTITUENT ELEMENT MAP, 1986



Grizzly bear habitat components are structurally based descriptions of sites that can be consistently recognized and have a structural or vegetative identity value to grizzly bears. Habitat components have been mapped for some areas of occupied grizzly habitat in the Northern Continental Divide Ecosystem. These are refined high resolution maps providing detailed, site specific habitat information pertaining to grizzly bears. The Badger-Two Medicine and Teton Birch BMUs have been completely habitat component mapped. Important habitat components for the East Front Region have been defined by radio telemetry studies conducted since 1977. Many components are important seasonally while others are used year around (Table 3). A difference was noted in seasonal importance between bears which occupy lowland habitats versus seasonal migrants utilizing lowland and mountainous habitats (Tables 4 and 5); (Aune et. al., 1986).

Many high use areas on the Rocky Mountain Front have been identified from radio telemetry studies. These areas may hold special significance to grizzly bears of the Rocky Mountain Front because of the juxtaposition and spatial arrangement of habitat components. These areas are not necessarily distinct and may join unidentified high use areas or interchange of animals may occur between these use areas. The following important grizzly use areas have been identified since 1976:

(A) Ear Mountain-Pine Butte ..... Sp/Su/fall
(B) Antelope Butte-Dupuyer-Walling Reef ..... Sp/Su/fall
(C) Elk-Blubber-Smith Creeks ..... Sp/Su/fall
(D) Sheep Mountain-Harrison Basin ..... Su/fall
(E) Elk Hill-Biggs Creek ..... Sp/fall
(F) South Fork Two Medicine-Badger area ..... Sp/Su/fall
(G) Teton River-Sun River Divide ..... Su/fall
(H) Crow Peak-Pyramid Peak ..... Su/fall
(I) Caribou Peak-Falls Creek ..... Su/fall

Table 3. Availability and grizzly bear use of habitat components, 1977-84.

Habitat Component	Spring Availability	Spring Use	Summer/Fall Availability	Summer Use	Fall Use	Total Use
Cutting Units	5/0.1	0/0.0	5/0.1	0/0.0	0/0.0	0/0.0
Meadows	209/5.4	4/0.8 (-)	210/3.7	2/0.4 (-)	1/0.2 (-)	7/0.5 (-)
Roads	38/1.0	1/0.2 (-)	38/0.7	0/0.0 (-)	1/0.2 (-)	2/0.1 (-)
Sidehill Park	20/0.6	2/0.4	67/1.1	1/0.2 (-)	0/0.0 (-)	3/0.2 (-)
Mountain Grassland	99/2.5	1/0.2 (-)	194/3.5	6/1.3 (-)	0/0.0 (-)	7/0.5 (-)
Prairie Grassland	1338/34.6	22/4.4 (-)	1338/23.6	19/4.1 (-)	7/1.5 (-)	48/3.4 (-)
Rock/Talus, Rubble/Scree	94/2.4	18/3.6	548/9.4	44/9.5	17/3.7 (-)	79/5.5 (-)
Limber Pine Savanna	335/8.7	23/4.6 (-)	347/6.1	16/3.4 (-)	4/0.9 (-)	43/3.0 (-)
Shrubfield	16/0.4	1/0.2 (-)	25/0.4	0/0.0 (-)	2/0.4	3/0.2
Snowchute	10/0.3	2/0.4	100/1.6	4/0.9	0/0.0 (-)	6/0.4 (-)
Populus Stand	152/4.0	131/26.0 (+)	152/2.7	100/21.7 (+)	79/17.2 (+)	310/21.8 (+)
Riparian Shrub	131/3.4	107/21.2 (+)	131/2.3	99/21.5 (+)	57/12.4 (+)	263/18.5 (+)
Riparian Complex	86/2.3	2/0.4 (-)	110/2.0	3/0.7 (-)	1/0.2 (-)	6/0.4 (-)
Closed Timber	1077/27.4	134/26.6	1711/30.1	116/25.3	219/47.7 (+)	469/32.9
Open Timber	253/6.5	55/10.9 (+)	694/12.2	48/11.5	71/15.3 (+)	174/12.2
Unclassified	3/0.1	1/0.2	7/0.1	2/0.2	1/0.2	4/0.2
	3866	504	5673	460	460	1424

(+) Used significantly more than expected ($P \geq .10$)
(-) Used significantly less than expected ($P \leq .10$)

Table 4. Availability and grizzly bear use of habitat components by lowland grizzly bears, 1977-84.

Habitat Component	Spring Availability	Spring Use	Summer/Fall Availability	Summer Use	Fall Use	Total Use
Cutting Units	5/0.2	0/0.0	5/0.1	0/0.0	0/0.0	0/0.0
Meadows	176/7.6	1/0.5 (-)	178/6.0	2/1.0 (-)	0/0.0 (-)	3/0.1 (-)
Roads	31/1.3	1/0.5 (-)	31/1.0	0/0.0 (-)	1/0.6 (-)	2/0.1 (-)
Sidehill Park	7/0.3	0/0.0 (-)	17/0.6	0/0.0 (-)	0/0.0 (-)	0/0.0 (-)
Mountain Grassland	41/1.8	0/0.0 (-)	86/2.9	2/1.0 (-)	0/0.0 (-)	2/0.1 (-)
Prairie Grassland	1085/47.1	8/4.3 (-)	1085/36.5	8/4.0 (-)	4/2.3 (-)	20/3.6 (-)
Rock/Talus, Rubble/Scree	46/2.0	1/0.5 (-)	250/8.3	2/1.0 (-)	0/0.0 (-)	3/0.1 (-)
Limber Pine Savanna	272/11.7	8/4.3 (-)	280/9.4	5/2.5 (-)	4/2.3 (-)	17/3.0 (-)
Shrubfield	9/0.3	0/0.0 (-)	14/0.5	0/0.0 (-)	0/0.0 (-)	0/0.0 (-)
Snowchute	4/0.2	0/0.0	37/1.2	0/0.0	0/0.0 (-)	0/0.0 (-)
Populus Stand	102/4.4	64/34.2 (+)	102/3.5	70/35.2 (+)	48/27.9 (+)	182/32.6 (+)
Riparian Shrub	117/5.1	63/33.7 (+)	117/3.9	69/34.7 (+)	32/18.6 (+)	164/29.4 (+)
Riparian Complex	48/2.0	0/0.0 (-)	60/1.9	2/1.0 (-)	2/1.0 (-)	2/0.1 (-)
Closed Timber	260/11.2	31/16.6 (+)	407/13.7	26/13.1	71/41.2 (+)	128/22.9 (+)
Open Timber	99/4.3	10/5.3	297/10.1	13/6.5 (-)	12/7.0	35/6.3 (-)
Unclassified	1/0.0	0/0.0	4/0.2	0/0.0	0/0.0	0/0.0
	2304	187	2970	199	172	588

(+) Used significantly more than expected ($P \geq .10$)
(-) Used significantly less than expected ($P \leq .10$)

Table 5. Availability and grizzly bear use of habitat components by seasonal migrants, 1977-84.

Habitat Component	Spring Availability	Spring Use	Summer/Fall Availability	Summer Use	Fall Use	Total Use
Cutting Units	5/0.1	0/0.0	5/0.1	0/0.0	0/0.0	0/0.0
Meadows	137/4.3	3/1.9 (-)	138/2.9	0/0.0 (-)	0/0.0 (-)	3/0.7 (-)
Roads	30/1.0	0/0.0 (-)	30/0.6	0/0.0 (-)	0/0.0 (-)	0/0.0 (-)
Sidehill Park	17/0.5	2/1.3	45/1.0	0/0.0 (-)	0/0.0 (-)	2/0.4 (-)
Mountain Grassland	79/2.5	0/0.0 (-)	164/3.5	0/0.0 (-)	0/0.0 (-)	0/0.0 (-)
Prairie Grassland	1038/32.9	5/3.2 (-)	1038/22.1	2/1.7 (-)	1/0.8 (-)	8/2.0 (-)
Rock/Talus, Rubble/Scree	84/2.7	12/7.7 (+)	488/10.4	29/25.0 (+)	13/10.3	54/13.6 (+)
Limber Pine Savanna	308/9.8	4/2.5 (-)	321/6.9	0/0.0 (-)	0/0.0 (-)	4/1.0 (-)
Shrubfield	16/0.6	1/0.6	23/0.5	0/0.0 (-)	2/1.6 (+)	3/0.7 (+)
Snowchute	9/0.3	1/0.6	93/1.8	2/1.7	0/0.0 (-)	3/0.7
Populus Stand	106/3.4	32/20.5 (+)	106/2.2	11/9.5 (+)	10/7.9 (+)	53/13.3 (+)
Riparian Shrub	94/2.9	13/8.3 (+)	94/2.0	4/3.4 (+)	8/6.3 (+)	25/6.3 (+)
Riparian Complex	61/1.9	1/0.6 (-)	84/1.7	0/0.0 (-)	0/0.0 (-)	1/0.2 (-)
Closed Timber	957/30.3	50/32.0	1474/31.4	45.38.9 (+)	68/54.0 (+)	163/41.0 (+)
Open Timber	213/6.8	32/20.5 (+)	576/12.5	23/19.9 (+)	24/19.1 (+)	79/19.8 (+)
Unclassified	1/0.0	0/0.0	5/0.1	0/0.0	0/0.0	0/0.0
	3156	156	4684	116	126	398

(+) Used significantly more than expected ($P \geq .10$)
(-) Used significantly less than expected ($P \leq .10$)

TRAVEL CORRIDORS

Travel corridors between and within the identified grizzly bear use areas and between constituent elements are very important. The following discussion by C. Jonkel in BGP Special Report No. 30 (Chicago Peak Developments) is appropriate.

"Travel corridors may lead to seasonal or alternative feeding areas, or they may connect major bear ranges across developed lands. The seasonal corridors are predictable and more easily located through bear observation or radio-tracking. Bears, like other species, will select areas with cover when traveling, be it only the occasional fence post, a draw, or a stream channel. Seasonal grizzly ranges are often interspersed with ranch or farming lands, or lie outside contiguous grizzly range, requiring that the bears travel past or near to people and their livestock." Aune and Stivers (1985) map out some important travel corridors in the Ear Mountain-Pine Butte area. Movement of bears across Highway No. 2 and Highway 200 indicate that corridors may exist in these area's and may be essential to maintenance of gene flow.

DATA DISPLAY AND STORAGE

The standard base map for the monitoring study were 1:24,000 USGS quads with:

Lewis and Clark Forest Land types
BLM habitat study types (from Pfister, et.al., 1977 and Mueggler, 1980)
Habitat components as they were mapped

The 1:24,000 quad series served as the standard basic work map. It was also felt to be the most appropriate scale to use for evaluation of specific project proposals.

Annual summaries of radio monitoring and other observation data by individual species were placed on overlays using the 1/2" to 1 mile USFS maps as a base. Radio location data were also placed on USGS 1:24,000 quads. Overlays depicting past and on-going activities such as timber harvest, recreation development and use, subdivision, etc. will also use this base for the areas where map coverage is available.

Specific data relating to food habits, home range, distribution, impacts of livestock, impacts of oil and gas, influence of roads, movement, habitat use, mortality and populations is available in annual progress reports produced from 1980-87. A final project report summarizing all aspects of the data discussed will be available by 1989.

MOUNTAIN GOAT INVESTIGATIONS DATA SUMMARIZATION

Rocky Mountain Front

HABITAT USE

Seasonal Distribution

Over 1500 observations of mountain goats were used to develop seasonal range use maps. The study area boundary, outlined on the distribution maps, describes the area which is annually surveyed. Within this area, all country above 1829 meters (6000 feet) occurring on slopes of 70 percent or greater are classified as known (number one on maps) or probable (number two on maps) use areas based on habitat selection data described previously. There is little definable difference between summer and winter habitat selection, so these seasons were combined. Known kidding-nursery areas are noted on the map if a solitary female was observed during May or June or if a group of goats which contained a kid was observed during June, July or August. Mapped information is more restrictive than the information used to analyze kidding-nursery areas because in the analysis, September observations of groups with kids were included to round out the summer season. Future delineation of nursery areas should include September data. Known breeding areas are identified. All observations of adult (2½ years of age and older) males and females during November and December were used to delineate breeding areas.

Kidding-Nursery Areas

Kidding-nursery areas occurred on all aspects and terrain types and most slopes and elevations within the study area. Generally they occur on east and northeast exposures on slopes of 90 percent or greater; between 2135-2438 m (7000-8000 feet) elevation; on land types 202, VI, 171 and 182; in all terrain types and on the crust, forest, parkland, short grass and brush vegetation types.

Summer Areas

Summer areas occur on all aspects and terrain types and most slopes, elevations and vegetation types within the study area. Summering areas tend to occur on east and northeast exposures; on slopes of 70 percent or greater; at elevations between 2134-2438 m (7000-8000 feet); on land types 202, VI, 171 and 182.

Breeding Areas

Breeding areas occur on all aspects and elevations within the study area, but tend to occur on southeast and east exposures; on slopes of 90 percent and greater; at elevations of 2134-2286 m (7000-7500 feet); on land types 202, VI, 182 and 171; on cliff and bluff terrain types; and crust, forest, parkland and krummholz vegetation types.

Winter Areas

Winter areas occur on all aspects but favor south, southeast and east; on slopes of 70 percent or greater; at most elevations but generally below 2286 m (7500 feet); on land types 202, VI and 182; on all terrain types but primarily cliffs, talus and ridges; on all vegetation types but particularly crust, forest, and parkland.

Minerals Licks

Eleven mineral licks are known to occur within the study area. The Walling Reef and Headquarters Pass licks may be natural mineral licks, but the other nine are artificially established sites. The Blackleaf, South Fork Dupuyer, Walling Reef, Our Lake, Headquarters Pass, North for Deep Creek and Frenchy Gulch sites are regularly used by goats. The South Fork Deep Creek lick is occasionally used. The degree of use of the Blindhorse, Walling-Split Mountain and Erosion Gulch licks is not known.

Mountain goats will use salt during all months of the year (DeBock 1970). Males tend to use licks during May, June and early July. Females generally do not begin using licks until after the kids are born in June, but they continue to use them into September.

In using licks, most ungulates are seeking sodium bicarbonate (Stockstad 1953 and Smith 1954). Hebert and Cowan (1971) indicate that there is a sodium imbalance in the diet of mountain goats during spring since the diet has shifted from dry winter forage to lush green forage which tends to flush the system of essential nutrients.

The mountain goats' desire for salt is strong and will lead them into unsafe surroundings out of normal mountain goat habitat, away from escape terrain. These circumstances will develop if artificial lick sites are established near the fringes of mountain goat habitat. Rideout (1974) hypothesizes that mountain goats will risk predation to satisfy their drive and need for salt.

BIGHORN SHEEP MONITORING DATA SUMMARIZATION

Rocky Mountain Front

MANAGEMENT OBJECTIVES

Human activities which can affect sheep and/or their habitat need to be managed to provide for Bighorn needs and minimize sheep/human conflicts.

The Sun River Bighorn sheep population is the largest herd in the contiguous United States. There are four major herd segments found in the Ford Creek, Sun River, Deep Creek and Ear Mountain areas. This population has increased from an estimated 260 head in 1943 (Couey, 1950) to approximately 1,000 head in 1983.

The management objectives are to maintain a minimum countable population of 800 head which is considered compatible with winter range carrying capacity. This would be made up of approximately 200 head on each of the four major wintering areas.

Habitat

Bighorns make use of three major habitat types. They are bunchgrass, rocky reef and old burns. Habitat types that have been influenced by past fires and are in close proximity to rocky terrain are of great significance for this species. The sheep make greater use of the bunchgrass type during the spring through the lambing period. They also make a seasonal migration to higher elevations during summer. Erickson (1972) found mean winter elevations of 5,045 feet while that in summer was 6,508 feet. Recent radio telemetry data has shown extensive movements about the summer range from rocky ridges to bunchgrass plateaus until the onset of winter.

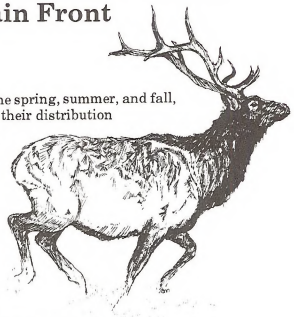
Data Display and Storage

To date nine Bighorn sheep have been radio collared in the study. Data from two years of monitoring has been collected and is being analyzed. These locations are being plotted on1:24,000 USGS quads. Various data such as UTM coordinates, elevation, slope, aspect, habitat type, topography, USFS Land form, etc., have been computer coded and are being run through Geoscan and Teldane programs. These data are being stored on computer files at Montana State University. Individual home ranges and seasonal distribution maps have been generated. These data will be overlayed on USFS 1/2 inch to the mile maps for interagency use.

Human disturbance factors such as seismic activity are being statistically compared to individual movement patterns and will be documented in annual progress reports.

ELK MONITORING DATA SUMMARIZATION

Rocky Mountain Front



Four radio collared cow elk were monitored throughout the spring, summer, and fall, 1981, to assess the effects of geophysical exploration on their distribution in the Badger Creek — South Fork Two Medicine River area of northcentral Montana. For comparison, movements of two radio collared elk summering in the Middle Fork Flathead drainage (where no seismic activity took place) were also monitored.

Seismic methods employed were mainly surface blasting with one line by porta-drill. Helicopters were used to transport men and equipment. A total of seven seismic lines were surveyed through the study area during August, September, and October by Seisdata Services, Inc., SEFEL Company, and Mountain Geophysical Corporation.

As helicopter and blasting activity proceeded eastward, elk generally began moving back into drainages occupied before exploration began. No locations were noted in direct line of sight of seismic work, rather the elk preferred to remain at least one ridge or drainage from the disturbance, mostly in heavy timber cover.

Based on average distances moved between flights for radio collared elk along the Middle fork Flathead River in the Great Bear Wilderness, the Two Medicine group moved at least 50% more between observations.

Another collared elk which summered in Glacier National Park moved over a steep pass into an adjacent drainage approximately the same time as seismic work began in the South Fork Two Medicine valley. Her average movements between locations for the summer-fall period were much the same as the Middle Fork Flathead elk.

Levels of activity in winter similar to that of this summer may cause severe physiological stress on the south Fork Two Medicine herd. Forced movements to marginal winter range may disrupt reproductive processes and nutritional balances. The net effect could be calf losses and death of weaker segments of the herd structure.

The following is reference literature used in "Effects of Seismic Exploration on Summering Elk in the Two Medicine-Badger Creek Area, Northcentral Montana", (Olson, 1981). The following literature was also used in formulating management guidelines for elk and elk habitat; Basile and Lonner, 1979; Black, et. al., 1975; Greull and Roby, 1975; Hershey and Leege, 1975; Hoskins, 1981; Johnson and Lockman, 1981; Joslin, 1981, (Personal communication); Kasworm, 1981; Knight, 1980; Leopold, 1980; Lonner, 1981; Lyon, 1975; Marcum, 1967; Morganti, 1979; Perry and Overly, 1977; Roberts, 1974; Rost, and Baily, 1979; Schallenberger, 1974; Smith and Bloomfield, 1980; Stubbs and Markham, 1979; Telfer, 1978; Thorne, et. al., 1976; Ward, 1975.

MULE DEER MONITORING DATA SUMMARIZATION

Rocky Mountain Front

Mule deer monitoring studies completed to date have been carried out by the Montana Department Fish, Wildlife and Parks through two graduate student studies conducted by Montana State University. Monitoring following those studies has been conducted by MDFW&P and MSU personnel. The BLM has provided a major portion of the funding, but supplemental funds were provided by MDFW&P, USFS, and industry grants.

Information collected is available in two thesis (Kasworm 1981, Ihsle 1982), four annual reports to the BLM (Kasworm and Irby 1980, Kasworm et al. 1981, Mackie and Irby 1982, Irby and Mackie 1983), a MDFW&P report to the USFS (Hook et al. 1982), and MDFW&P Job Progress Reports (McCarthy et al. 1980-1982). Those persons interested in more detailed information should consult these sources.

MULE DEER STUDY OBJECTIVES

1. To determine the seasonal distribution, movements, and habitat usage of mule deer on a representative portion of the Rocky Mount Front range subject to mineral exploration and development.

2. To determine mule deer population status and trend on the study area and/or portions thereof, including any identifiable herd segments of units.

3. To identify and describe seasonally important range areas and vegetation types used by mule deer on the Rocky Mountain Front.

4. To identify and/or provide basis for future quantitative evaluation of mule deer range use, populations, and habitat responses to disturbance and other activities associated with mineral exploration and development and/or other land use management practices on the Rocky Mountain Front range.

SEASONAL DISTRIBUTION

Winter Ranges

Aerial and ground survey information accompanied by observations of marked animals and radio relocations led to the designation of seven winter ranges. Six of these were occupied at the beginning of the study and the seventh, Swanson's Ridges, was occupied during the course of the study and probably represents either an extension of the Dupuyer Winter Range (WR) or a separate range occupied at moderate to high mule deer population levels. Locations of the ranges are given on page 26. Approximate sizes (primary + secondary) are given in Table 1.

Identified mule deer winter range, Sun River to Birch Creek. Approximate total winter range area and tentative herd range areas (based on radio-relocations and neckband sightings through 1982) are given.

Table 1

Winter Range	Total Winter Range (km^2)	Tentative Herd Range (km^2)
Scoffin Butte	26.6	580
Dupuyer Creek	31.6	360
Swanson's Ridges	29.2	[1]
Blackleaf-Teton	80.8	330
Ear Mountain	44.0	380
Long Ridge	37.6	[1]
Castle Reef	38.9	1060

[1] No marked animals were available for herd range estimation.

Individuals maintained high fidelity to winter ranges. All radio-collared and all but three neckbanded individuals known to have returned to winter range, returned to the winter ranges on which they were captured.

Transition Ranges

Several areas used by mule deer as transitional range were identified and are delineated on the map on page 26. Animals which summer west of the Continental Divide appear to move to transition areas east of the divide with the first major fall storms. The major use of transition ranges is during October-December when they apparently provide a measure of security during hunting season. Spring movement (May-June) routes pass through the transition areas indicating that these areas may serve as fawning sites for some does.

Migration Corridors

Radio tracking data indicates several major drainages and passes as being important migration corridors. These drainages and corridors are shown on the map on page 26.

Summer Ranges

The association of summer ranges with each winter range has been tentatively identified from radio-relocations, marked animal returns, and sightings of neckbands. Summer range fidelity appears to be quite high. Fifteen out of 16 radioed females for which two years or more of data are available used the same summer ranges each year. Of 22 radioed deer, 27% summered west of the Continental Divide, 14% summered along the mountain front, and 59% summered in drainages between the divide and the mountain front. The low numbers of mule deer wintering west of the study area strongly suggest that population units occupying East Front winter ranges include most of the deer summering in the portion of the Bob Marshall wilderness, Lewis and Clark National Forest, and Flathead National Forest lying north of the Sun River, south of Glacier National Park, and east of the upper South Fork of the Flathead River.

POPULATIONS DYNAMICS

Population Estimate and Trend

The available information suggests that the mule deer population in the study area increased from 1975-1983. Helicopter counts during this period gave erratic results (Table 2) but distributional changes (i.e., increases in areas reported occupied by deer in winter) and impressions of personnel familiar with the area supported this contention. Helicopter surveys during years in which sufficient numbers of marked animals were available for use of the Lincoln Index (Table 2) and regression analyses used to adjust helicopter counts for differences in weather or snow conditions (Irby, unpubl. data) also indicated a steady increase.

Number of deer counted along the Rocky Mountain Front (Sun River to Birch Creek) may not represent a firm basis for a total population estimate since deer captured and marked for the Lincoln Index were taken primarily from the subpopulation which tended to stay on the lower winter range areas during mild to moderate (1981 and 1980 samples, respectively) winter conditions, but the derived population estimates were representative of a major portion of the population and showed (based on March estimates) increases of 6% between 1980 and 1981 and 2% between 1981 and 1982 (Table 2).

Results of helicopter surveys of mule deer on winter ranges, Sun River to Birch Creek. Population estimates based on the Lincoln index approach are given for 1980-82.

Table 2

Date	Winter/Snow Condition	South of Teton	North of Teton	Total	Population Estimate
Feb 1975	Severe	1687	1157	2842	
Feb 1978	Moderate	1740			
Feb 1979	Severe	2003	1529	3532	
Apr 1979	Moderate	1318	964	2282	
Mar 1980	Moderate	2015	1473	3488	5653
Apr 1980	Moderate	1261[1]	1460		
Mar 1981	Mild	1840	1559	3399	6014
Apr 1981	Mild	1015	1291	2306	4838[2]
Jan 1982	Severe	2562	2531	5093	
Mar 1982	Mild	1383	1947	3330	6110
Jan 1983	Mild	1075[3]	1678	2753	

[1] Long Ridge WR not counted.
[2] Many animals had dispersed onto transition range at the time of the count.
[3] Part of the Long Ridge WR was missed and many animals had not moved from transition to winter range.

(Results from helicopter surveys indicated that trapping and marking of deer should be undertaken every two years if the Lincoln Index is to be used. This trapping frequency could probably be reduced to once/3 years. If fulltime personnel were available to monitor (i.e., identify marked individuals prior to surveys) winter ranges intensively.)

Production

Early to mid-winter fawn; doe ratios (Table 3) were generally near or above long-term averages throughout the 1980-83 period. Late winter ratios in 1980-82 were consistent with those expected in a healthy herd. Ground observations during 1980-81 on five winter ranges showed no statistical differences in productivity (fawn: does or adult ratios) among winter ranges. Helicopter survey data indicate that buck percentages in the population may be declining slightly south of the Teton and increasing north of the Teton, but too few data are available to interpret this apparent trend.

Early-mid winter fawn to adult ratios on mule deer winter ranges, Sun River to Birch Creek.

Table 3

Hunting District	N/100 Adults				
	MDFW&P 1961-79[1] (x = SD)	1980[2]	1981[2]	1982[2]	1983[3]
H.D. 441 (north of Teton River)	51 + 14	71	50	53	49
H.D. 442 (south of Teton River)	53 + 12	69	53	40	56

[1] Ground observations, December-March
[2] Ground observations, January-February
[3] Helicopter observations, January

Age and Sex Structure of Population (hunting kill and post-hunting live)

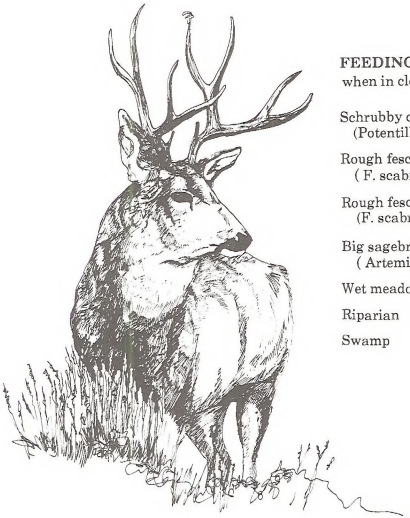
Data collected at two check stations on the Teton and Blackleaf roads during 1980 indicated 61% of the mule deer harvest was male. Forty percent of deer captured during post-season helicopter drive net operations in 1980 and 1981 were male. Age distribution of harvested mule deer consisted of 16% fawns, 54% yearlings, and 30% 2+ years. Captured deer and an age structure (average of 1980 and 1981) of 29% fawns, 12% yearlings, and 59% 2+ years.

Habitat

Cover type maps of winter concentration areas, low use zones, transition areas, and summer ranges of radio-collared animals have been prepared and are available at the Great Falls BLM office. Important habitat types identified on winter range include:

COVER AND FORAGE AREAS

Limber pine/Rough fescue (Pinus flexilis/Festuca scabrella)
Limber pine/Juniper (P. flexilis/Juniperus sp.)



FEEDING SITES (use of these sites is increased when in close proximity to the preceding types)

Schrubby cinquefoil/Rough fescue
(Potentilla fruticosa/F. scabrella)

Rough fescue/Idaho fescue
(F. scabrella/F. idahoensis)

Rough fescue/Bluebunch wheatgrass
(F. scabrella/Agropyron spicatum)

Big sagebrush/Rough fescue
(Artemisia tridentata/F. scabrella)

Wet meadow

Riparian

Swamp

Topographic Character

Winter ranges differed from adjacent low use areas in that winter ranges were consistently lower in elevation, had a wider availability of aspect classes, and had a greater percentage of the total land surface in moderate and steep slope categories. Although analyses are still incomplete, high density winter ranges appear to differ from low density winter ranges primarily in elevation. High density winter ranges were situated in areas that allowed mule deer to move to relatively low elevations and still find broken terrain, favorable cover conditions, and aspect/slope configurations that promoted snow melt during chinook conditions.

Gas and Oil Impacts

Impact of oil and gas exploration were difficult to assess during the intensive phase of the study due to the low level of activity, the mild winter conditions, and the low density of deer in the vicinity of active well sites. The limited data available showed no obvious avoidance by radio-collared deer in the vicinity of the Blackleaf well sites and no apparent long-term change in home ranges of radioed animals exposed to seismic activity.

RAPTOR MONITORING DATA SUMMARIZATION

Rocky Mountain Front

SOURCES OF INFORMATION

Short-term raptor surveys were previously conducted by the U.S. Bureau of Land Management (Gramlich 1979), U.S. Forest Service (Schallenberger 1975) and the Nature Conservancy (Crenshaw 1979). Wenzel (1982) gathered raptor information incidental to other work for the U.S. Bureau of Land Management. The present survey, funded by U.S. Fish and Wildlife Service, was initiated in December 1981 (DuBois 1983, 1984).

OBJECTIVES OF THE STUDY

1. Determine distribution, abundance, and habitat use of the raptor species found on the Rocky Mountain Front.
2. Describe nesting habitat and productivity of nesting raptors.
3. Delineate suitable nesting habitat for the bald eagle and peregrine falcon, regardless of current occupancy.
4. Delineate winter concentration areas for bald eagles.
5. Determine responses of raptors to human activities, when possible.

NESTING POPULATION DENSITY

The total nesting population was estimated to be about 271 pairs (16 species) in the area covered, or a density of 9.5 pairs per 100 square kilometers. Nesting densities for species of special interest to state and federal agencies (Flath 1981) were: golden eagle - 0.7, prairie falcon - 1.1, merlin - 0.1, ferruginous hawk - 0.3, and northern goshawk - 0.2 pairs per 100 square kilometers. No nesting bald eagles or peregrine falcons were located, though suitable nesting habitat is present for both.

NESTING HABITAT

Cliff and riparian habitats were the two most important habitats for nesting raptors. Approximately 151 kilometers of cliffs were present, or about 0.5 percent of the study area. Cliffs provided nesting habitat for all of the prairie falcons, 87 percent of the golden eagles, and a small percentage of red-tailed hawks, ferruginous hawks and great horned owls. Riparian habitat covered only 5.4 percent of the study area, yet provided nesting habitat for 96 percent of the Swainson's hawks, 93 percent of the red-tailed hawks, 60 percent of the great horned owls, and 4 percent of the golden eagles. The northern harrier, American kestrel, saw-whet owl, and western screech-owl were suspected to nest primarily in riparian habitat.

BALD EAGLE WINTER CONCENTRATION AREAS

The wintering bald eagle population was estimated to be no more than 15 birds on the Sun River — Elk Creek area near Augusta and 5 birds on the Teton River near Choteau during the winter of 1981-82. Few bald eagles were observed during the winters of 1982-83 and 1983-84, possibly due to the unusually mild weather.

RESPONSES OF RAPTORS TO HUMAN ACTIVITIES

Observation of reactions of raptors to human activities were limited, so information from the literature was heavily used in the formulation of the guidelines, including GYE Bald Eagle Working Team (1983), Ellis (1982, 1981), Suter and Jones (1981), Becker and Ball (1981), Thurow et al. (1980), Call (1979), and Fyfe and Olendorff (1976).

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